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ACCESS PROJECT REPORT SERIES:

Evaluation of Existing Financing Mechanisms & Program Designs for Low to Moderate Income Solar PV Programs

How Existing Co-op Program and Financing Mechanisms Support Solar Access for Low- to Moderate-Income Members

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How Existing Co-op Program and Financing Mechanisms Support Solar Access for Low- to Moderate-Income Members

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About this Report Series

Solar costs have declined dramatically in recent years to surpass the goals set by Department of Energy (DOE) for the year 2020. The cost of hardware, as well as soft costs including installation labor, permits and overhead costs, have both come down, but the soft costs are still substantial and result in a cost barrier that limits access to the benefits of solar for all. This higher cost is particularly important in a cooperative (co-op) territory where average incomes are lower than national averages and poverty rates are higher.

Many co-ops have been able to develop solar generation for their members as a result of prior DOE programs and action. DOE and NRECA's success with the **Solar Utility Network Deployment Acceleration (SUNDA)** project demonstrated that innovations in co-op solar business models could quickly move solar resources from niche-based to widely deployed technology nationally.

Recently, NRECA launched its initiative [Advancing Energy Access for All](#), which spotlights cooperatives' involvement in facilitating healthy communities, explores the innovative ways they do it, and uncovers new directions community assistance programs are taking. Advancing Energy Access for All helps ensure rural communities are not left behind and is also an essential element of every cooperative's existence. A flagship project from this initiative is the [Achieving Cooperative Community Equitable Solar Sources \(ACCESS\)](#) project, a federally funded three-year, research project and collaboration among U.S. electric cooperatives, CoBank, the National Rural Utilities Cooperative Finance Corporation (NRUCFC/CFC), Pacific Northwest National Laboratory (PNNL), GRID Alternatives, and NRECA. The ACCESS project is funded by the U.S. Department of Energy's Solar Energy Technologies Office (SETO) whose overarching goal is to improve the affordability, performance, and value of solar technologies on the grid. Through this project, tools and resources will be developed to assist electric co-ops and the broader industry deploy solar projects to benefit low- to moderate-income (LMI) consumers.



This is the second report in [this series](#). The first report explored the variety of programs and services offered by co-ops that help LMI members, while often simultaneously benefiting other members, the co-op, and the grid. The third and final report in this series will look at market analysis and trends for solar energy and storage from the perspectives of generation and transmission electric cooperatives (G&Ts). The ACCESS project will also produce a gap analysis that reviews challenges around LMI access to solar energy, and solutions and pathways for tackling the challenges.

For questions or inquiries, please contact our team at: SolarAccessProject@nreca.coop

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The ACCESS Project includes seven lead cooperatives and a broad group of industry stakeholders who provide diverse expertise that is essential to the project's analysis and resulting tools and resources. The participating cooperatives include the following:

- Anza Electric Cooperative, Anza CA
- BARC Electric Cooperative, Millboro VA
- Kit Carson Electric Cooperative, Taos NM
- Oklahoma Electric Cooperative, Oklahoma City OK
- Orcas Power and Light Cooperative, San Juan Island WA
- Ouachita Electric Cooperative Corporation, Camden AR
- Roanoke Electric Cooperative, Aulander NC

The list of participating stakeholders can be found on our [ACCESS website](#) on cooperative.com. Stakeholders who reviewed and provided feedback to this report are: Environmental and Energy Study Institute (EESI), Duke University's Nicholas Institute for Environmental and Policy Solutions and Southern Environmental Law Center (SELC)

Contributors to this specific report are mentioned throughout the report and include:

- Blue Ridge Energy
- Mountain Parks Electric, Inc.
- Cherryland Electric Cooperative
- Clean Energy Works
- EESI
- Holy Cross Energy
- Ouachita Electric Cooperative Corporation

We would like to thank all of these cooperatives and other industry stakeholders for sharing their experiences and ideas to support the success of the ACCESS project and for the benefit of cooperatives nationwide.

Disclaimer

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Background: The ACCESS Project

NRECA’s solar energy project, *Achieving Cooperative Community Equitable Solar Sources* (ACCESS), is the flagship project of NRECA’s *Advancing Energy Access for All* initiative. This initiative spotlights the innovative ways cooperatives approach community development and support for their consumer-members, as technology advancements continue to transform our industry.

ACCESS will explore and amplify the use of innovative, cost-effective energy access programs to help increase solar affordability, with particular focus on assisting low and moderate income (LMI) consumers. ACCESS will research varying financing mechanisms and program designs to help identify solutions for electric cooperatives and other small utilities, including field tests of diverse co-op solar projects around the country. Through this project, tools and resources will be developed to assist electric co-ops and the broader industry deploy solar projects to benefit LMI consumers.

Introduction

Photovoltaic (PV) solar has grown in the U.S. by nearly 50% every year for each of the past ten years, and today exceeds 85 GW of capacity. During this time, costs have dropped by more than 70%¹ and cooperative consumer-member interest in solar energy has continued to increase. Some co-op consumer-members have installed solar themselves. Many have signed up for community solar programs offered by the co-op.² However, due to upfront or extra costs, these programs are often out-of-reach for low- and moderate-income (LMI) Americans.

Barriers to LMI solar and access opportunities are being heavily investigated by the National Renewable Energy Laboratory (NREL)³ and other national labs, governmental agencies, energy efficiency and environmental organizations, and electric utilities. Commonly identified barriers are lack of savings, inability to take on debt financing, lack of home ownership, ownership of home that is unsuitable for or would need upgrades before PV could be installed, language barriers, and split incentives⁴ for landlords of multi-family dwellings.⁵

However, according to a 2018 NREL analysis, the savings potential of solar for LMI families is significant. Figure 1 illustrates the percentage of electricity consumption at single-family LMI households (defined in this analysis as 0 – 80% of the area median income) that can be offset with rooftop solar generation. While not all LMI solar programs utilize rooftop solar, the data show the sizable opportunity for solar to reduce household energy bills. Figure 1 and Figure 2 show that large sections of the country have the potential to reduce LMI household electricity bills by 50% or more with solar.

¹ <https://www.seia.org/solar-industry-research-data>

² More than 200 distribution cooperatives offer more than 140 MW of community solar, according to NRECA's 2020 data.

³ <https://www.nrel.gov/solar/solar-market-publications.html>

⁴ A split incentive is a condition "in which capital improvements that yield energy savings result in one party paying for improvements while the other party receives the benefits of reduced utility costs." See: <http://www.cbei.psu.edu/split-incentives-and-green-leases/index.html>

⁵ For one summary, see: <https://www.nrel.gov/state-local-tribal/lmi-solar.html>

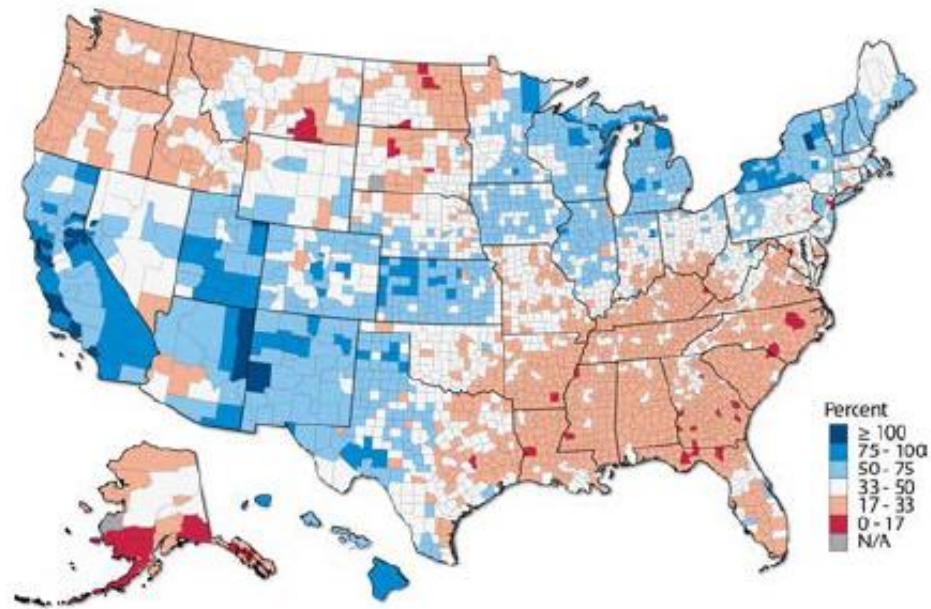


Figure 1: Percent of LMI electrical consumption that can be offset by rooftop solar generation – Single-family owner-occupied LMI buildings only. Source: NREL 2018⁶

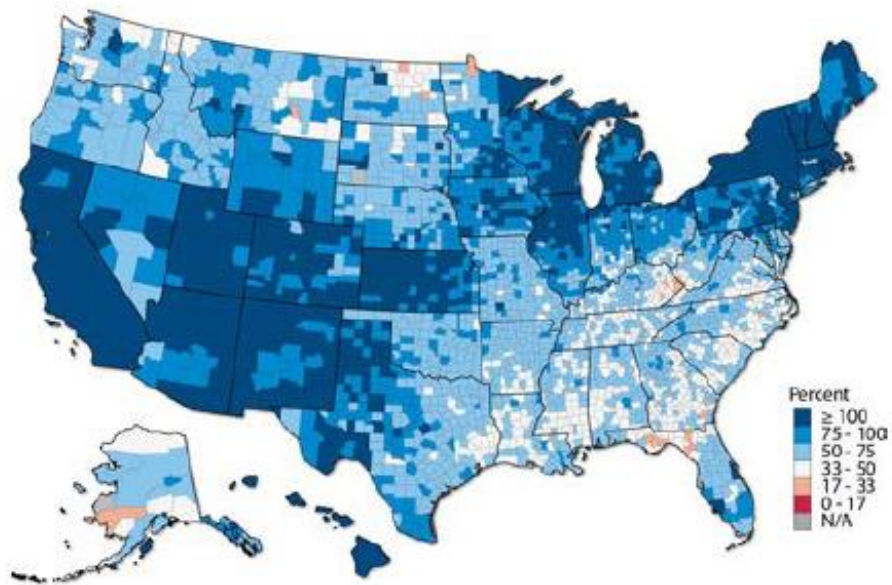


Figure 2: Percent of LMI electrical consumption that can be offset by rooftop solar generation – All LMI buildings. Source: NREL 2018⁷

⁶ Sigrin & Mooney 2018 (NREL)

⁷ Sigrin & Mooney 2018 (NREL)

Furthermore, the benefits of LMI solar programs reach beyond the household level. For example:

The U.S. Department of Housing and Urban Development (HUD), especially, is starting to use solar to improve energy security for the millions of low-income Americans it serves, while saving taxpayers some of the \$5 billion HUD spends annually on utility bills. By installing solar technologies, shelters, food kitchens, churches, and service organizations of all kinds could redirect energy savings toward their primary mission (Paulos 2017 p. 6).

LMI solar programs may also include job training and education opportunities, land lease opportunities for schools and non-profits, and outreach and engagement opportunities for distribution utilities, including electric cooperatives. In recognition of the value of LMI solar, today 15 states and the District of Columbia have policies and programs to enable LMI participation in solar energy.⁸

Fortunately, co-ops already have many of the pieces in place for LMI solar programs — for rooftop installations, community solar gardens, community installations, or other innovative approaches — that lower barriers to access to solar energy and help reduce electricity bills.

⁸ CESA 2018

Building LMI Solar Programs off Existing Programs and Tools

As discussed in the first report in this series, electric cooperatives already have programs, financing arrangements, and partnerships that enable them to support LMI members. A subset of these, discussed in this report, is particularly applicable to LMI solar programs. This section includes brief descriptions of several measures and related programs that are well-suited for LMI solar programs, followed by a [Case Studies](#) section with examples from co-ops and other utilities.

Rooftop Solar

Co-ops across the country are working with members who want to install solar panels on their roofs or elsewhere on their property. For grid-tied systems, co-ops offer net metering or buy all/sell all plans to compensate members for their solar generation. In general, rooftop solar is associated with higher-income households since the initial investment, before tax credits, is around \$20,000 for a typical 5 kW residential PV system.⁹ While federal and sometimes state tax credits can reduce this amount by several thousand dollars, these credits are useful only for households with tax liability. However, a 2018 NREL study found that “a substantial fraction (42%) of the national residential rooftop solar potential is located on LMI buildings and, for all incomes, a substantial fraction is located on multi-family and renter-occupied buildings” (Sigrin & Mooney 2018).



Figure 3: Rooftop Solar Panels on Multi-family Housing

⁹ <https://sites.energycenter.org/solar/homeowners/cost>

States, non-profits, and electric utilities, including electric cooperatives, are starting to offer programs to lower the barriers for rooftop solar for LMI households. In the nation's capital, the Solar for All program has a goal of making solar available to at least 100,000 LMI families in the District of Columbia. Through partnerships with the DC Department of Energy and Environment and non-profit community organizations and installers, the Solar for All program will install new PV systems on single-family homes, as well as community locations, to benefit residents in multi-family buildings and other renters. Participants are projected to realize a 50% savings on their electricity bill over 15 years.¹⁰

Mountain Parks Electric in Colorado and the state of Hawaii both offer examples of on-bill loans and tariffs for residential rooftop and other solar measures. See the [Case Studies](#) section later in this report. In addition, Delaware Electric Cooperative offers its members grants for PV installations.¹¹

Community Solar

Because rooftop solar is not feasible or desirable for many people due to lack of home ownership, inadequate roof space, or inability to make upfront investments, community solar programs have sprung up across the country. Today, 40 states have at least one community solar project,¹² and co-ops are national leaders in this area. A 2016 Deloitte report found that co-ops administered more than two-thirds of utility-led community solar programs nationwide. In community solar programs, participants typically pay subscription or leasing fees for a certain number of panels or defined solar output, then receive bill credits through virtual net metering for electricity generated by their share of PV panels.

Many community solar programs require participants to make upfront payments, which makes it difficult to impossible for LMI households to participate.¹³ To address this, several states are developing mechanisms to help LMI households access solar.¹⁴ New York, Illinois and Massachusetts provide incentives to lower costs for income-qualified participants, and Minnesota, Colorado, Connecticut, Maryland, and New Jersey, to operate community solar programs and designate certain portions of some community solar developments for LMI residents.^{15,16} For example, Massachusetts's Solar Massachusetts Renewable Target (SMART) program offers bonuses for certain types of installations plus a baseline incentive amount. It includes adders for low-income customers; adders increase the per kWh incentive. Systems under 25 kW that serve low-income customers receive 15% more than other similar-sized installations.¹⁷

¹⁰ <https://doee.dc.gov/solarforall>

¹¹ <https://www.delaware.coop/energy-savings-programs/solar-grants>

¹² <https://naseo.org/issues/solar/issi>

¹³ Gagne & Aznar 2018

¹⁴ <https://www.lowincomesolar.org/best-practices/community-solar/>

¹⁵ <https://naseo.org/issues/solar/issi>

¹⁶ For example, Minnesota:

<https://www.revisor.mn.gov/statutes/cite/216b.1641#:~:text=1641%20COMMUNITY%20SOLAR%20GARDEN.&text=The%20community%20solar%20garden%20program,than%20a%2040%20percent%20interest>.

¹⁷ https://www.lowincomesolar.org/wp-content/uploads/2020/12/LISPG-Community-Solar-Policy-Chart_2020-update.pdf

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In 2020, more than 200 distribution cooperatives offered more than 140 MW of community solar, and many of their existing program elements can be leveraged for LMI solar programs, including:

- A structure enabling members to own or subscribe to a portion of the array,
- Co-op staff who are knowledgeable about solar energy and solar programs,
- Relationships with project partners including landowners, developers, and institutions such as United States Department of Agriculture (USDA), Cooperative Finance Corporation (CFC), and CoBank,
- Experience with solar developments and PPAs, either directly or through G&Ts,
- Billing system that accommodates virtual net-metering or other solar program-related rates, billing methods, or compensation structures,
- Community solar marketing and social media materials, and
- Websites or apps that enable members to track production from their panels.

Furthermore, some co-ops have started to expand community solar participation opportunities to LMI members. Instead of large upfront investments, these programs offer:

- Payment plans to distribute upfront investment over several months,^{18, 19}
- Low monthly subscription fees,^{20, 21}
- Short-term contracts which can benefit renters or others who may relocate often,²²
- On-bill loans or tariffs to pay for subscription fees,^{23, 24, 25} and
- Grants, in-kind contributions, or other philanthropic funds to cover community solar participation costs.^{26, 27}

With these and other existing community solar program and financing options, co-ops can help to open doors for LMI members to access clean power and lower bills, while not burdening members who do not wish to participate in or support LMI community solar offerings.

¹⁸ Example: Western Iowa Power Cooperative: <https://www.wipco.com/renewable-energy/community-solar> and

¹⁹ Example: Poudre Valley Rural Electric Association (PVREA): <https://pvrea.coop/mylocalsolar>

²⁰ Example: Blue Ridge Energy, <https://www.blueridgeenergy.com/>. See Case Studies section of this report.

²¹ Example: Blue Ridge Electric: <https://www.blueridge.coop/content/community-solar-0>

²² Example: GreenPower Electric Membership Corporation <http://gpemcsolar.coopwebbuilder2.com/content/advantages>

²³ Example: Mountain Parks Electric, <https://www.mpei.com/>. See Case Studies section of this report.

²⁴ Example: Ouachita Electric, <https://www.oecc.com/>. See also NRECA Advancing Energy Access for All Case Study: <https://www.cooperative.com/programs-services/bts/Documents/Secure/Advisories/Advisory-Advancing-Energy-Access-for-All-Case-Study-Quachita-July-2019.pdf>

²⁵ Example: La Plata Electric Association, <https://www.lpea.coop/>. See also case study included in NRECA ACCESS program report: <https://www.cooperative.com/programs-services/bts/Documents/Reports/ACCESS-Report-1-Coops-and-LMI-January-2021.pdf>

²⁶ Example: Roanoke Electric, <https://www.roanokeelectric.com/>. See also NRECA ACCESS Program Case Study on Roanoke Electric: <https://www.cooperative.com/programs-services/bts/access/Documents/Advisory-ACCESS-Case-Study-Roanoke-Oct-2020.pdf>

²⁷ Example: Poudre Valley Rural Electric Association (PVREA) PV for All Program <https://pvrea.coop/pvforall>

Community Installations

Similarly, co-ops may find that solar installations on community buildings can benefit LMI members, even if individuals do not own or lease panels. Co-ops may be able to partner with public schools, community centers, or tribes on solar installations that will provide shared benefits to the co-op and the community. Bill savings from a PV installation at a school or community center could free up budget for other needs, such as more staff, laptops, or expanded lunch programs. Also, working together early during project planning can help the co-op and community host site find mutually beneficial solutions around siting and land leases, workforce training, educational opportunities, or shared uses like pairing a solar array with electric vehicle charging stations. Community solar installations could also be incorporated into microgrids in LMI neighborhoods or tribal lands, supporting the co-op and the community with resiliency solutions.²⁸

Oklahoma Electric Cooperative (OEC)²⁹ partnered with Norman Public Schools (NPS) to develop a 2 MW utility-scale project on public school land which went online in December of 2020. The project is part of a Norman, OK Solar Park and Learning Center. Its goals include providing revenue to NPS through land lease payments and possibly Renewable Energy Credits (RECs).³⁰ This project will benefit the community — where half of the students received free or reduced-price meals — with renewable energy, learning opportunities, and new streams of revenue for the school district.



Figure 4: Oklahoma Electric Cooperative and Norman Public Schools Solar Array.
Image courtesy of Oklahoma Electric Cooperative.

²⁸ See also NRECA ACCESS Program Report 1: <https://www.cooperative.com/programs-services/bts/Documents/Reports/ACCESS-Report-1-Coops-and-LMI-January-2021.pdf>

²⁹ <https://okcoop.org/oec-announces-new-solar-partnership-with-norman-public-schools/>

³⁰ For more information on RECs, see NRECA Business & Technology Advisory: *Delivering Value through Green Tariffs*, <https://www.cooperative.com/programs-services/bts/Documents/Advisories/Advisory-Green-Tariffs-for-Co-ops-February-2020.pdf>

Rates

More and more, co-ops are expanding their residential rate offerings to give members more control over their bills, and to help the co-op manage peak demand on the system and keep rates low for all members. While few of these rates are specific to solar, some illustrate how rate design can address the changing needs of members and cooperatives.

[NRECA's 2016 Rate Case Study](#) report profiles several co-ops with new approaches to residential rates. As co-ops and members add solar to the grid, time-based rates, net metering plans, and demand rates, potentially combined with load controls and electric vehicle charging rates, can influence the use and conservation of electricity at strategic times.³¹

Despite the different approaches, when rolling out new rates, the profiled co-ops emphasized the need for staff and member education. Many members are not familiar with terminology used in electric utility billing. To that end, Garkane Energy in Utah branded their time-of-use rate “[Half-Price Power](#).” Cobb EMC helps its members navigate different rate choices with an interactive [Rate Selection Tool](#) on their website. Members can choose which of four member profiles best apply to them and then see a list of recommended rate options.

Financing

Some co-ops have employed a variety of financing tools for weatherization and energy efficiency. Many of these could be readily applied to future LMI solar programs, including LMI solar programs, and some co-ops are already testing them out for this purpose.

Nearly 100 co-ops now offer on-bill loan and tariffed on-bill programs that remove members' upfront costs of weatherization, energy efficiency, and now, renewable energy measures.³² Some of these programs meet the trademarked requirements of the Pay As You Save (PAYS)® program,³³ which was originally developed by the Energy Efficiency Institute, Inc.³⁴

Some co-ops self-finance these programs. Many use USDA funding while others may secure program financing from private banks, including community development financial institutions (CDFIs)³⁵ and credit unions. Green banks may also present a financing option for co-ops.³⁶ Data from 18 utility tariffed on-bill programs in eight states show that these programs can be sound investments. “[These programs] have

³¹ These approaches are discussed in more detail in the first report in the ACCESS report series, *How Cooperatives are Supporting Their Members in Need*, <https://www.cooperative.com/programs-services/bts/Documents/Reports/ACCESS-Report-1-Coops-and-LMI-January-2021.pdf>

³² See REMagazine article: <https://www.cooperative.com/remagazine/articles/Pages/essential-services-help-low-moderate-income-members.aspx>

³³ <https://www.cleanenergyworks.org/faq/what-is-pay-as-you-save/>

³⁴ For more information, see: <https://www.eeivt.com/wordpress/how-pays-works/>

³⁵ Example: La Plata Electric Association, <https://www.lpea.coop/>. See also case study included in NRECA ACCESS program report: <https://www.cooperative.com/programs-services/bts/Documents/Reports/ACCESS-Report-1-Coops-and-LMI-January-2021.pdf>

³⁶ For example, see: <https://coalitionforgreencapital.com/>

deployed more than \$40 million for thousands of cost-effective energy efficiency upgrades with a cost recovery rate averaging above 99.9%, even in persistent poverty areas” (Hummel and Toth 2019, p. 1).³⁷

The USDA [Rural Energy Savings Program \(RESP\)](#)³⁸ funding is one resource for electric cooperatives and for future LMI solar programs.³⁹ To date, 30 rural utilities have borrowed more than \$100 million total in 0% interest RESP loans to finance on-bill loan and tariffed on-bill programs for energy efficiency, beneficial electrification, and renewable energy measures. RESP legislation was passed as part of the 2014 Farm Bill and has been reauthorized through 2023. Several co-ops have recently begun to use RESP to finance members’ rooftop solar or community solar garden shares.⁴⁰ The Environmental and Energy Study Institute (EESI) helps co-ops access RESP funding at no charge.⁴¹

Comments from Co-ops about RESP Funding

“The RESP funds can be used for a wide variety of energy efficiency upgrades. You are not limited to building envelope improvements. The reimbursement process has been easy and efficient. I applaud RUS/Department of Agriculture for providing this package to our cooperatives.”

Leslie Holloway, Manager, Member Services
Ouachita Electric Cooperative Corporation, Camden AR

“We’ve noticed multiple benefits [from RESP funds] to both our cooperative and our members. First, the ability to match costs with savings through on-bill financing increases program participation and accelerates the timeline for Distributed Energy Resource (DER) adoption since RESP programs can remove the burden of large upfront investments for members. Secondly, we can keep program costs low due to the zero-percent capital costs through RESP. The interest-free funds make the difference between an investment penciling out and costs being too high for broad program acceptance.”

Seth Perry, Business and Data Analyst and
Sam Whelan, Manager, Power Supply
Holy Cross Energy, Glenwood Springs CO

³⁷ See also: <https://libertyhomes.org/publications>

³⁸ <https://www.rd.usda.gov/programs-services/rural-energy-savings-program>

³⁹ Note that other USDA funding sources have also been used previously for co-op on-bill financing. Future availability of non-RESP USDA funding is unknown at this time. At the time of this publication, RESP is open for applications from eligible entities.

⁴⁰ EESI n.d.

⁴¹ <https://www.eesi.org/Rural-Energy-Savings-Program>

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Co-ops may also be able to leverage state and federal energy assistance programs that they are already familiar with, including the Low Income Home Energy Assistance Program (LIHEAP) and Weatherization Assistance Program (WAP) to help LMI members access solar. (See [Case Studies](#) section for examples of co-op solar programs that leverage these programs.)

The Low-Income Home Energy Assistance Program (LIHEAP) has traditionally provided weatherization support and emergency bill payments, but in some states, including Colorado,⁴² portions of these funds may be used for cost-effective solar installations at qualifying homes. LIHEAP's Assurance 16 energy education program allows for energy assistance service providers to identify and educate people in need to ultimately reduce dependence on energy assistance services.⁴³

The Weatherization Assistance Program (WAP) was recently reauthorized through 2025 in the Consolidated Appropriation Act of 2021, signed into law on December 27, 2020. In addition, this Act included several amendments⁴⁴ to the Energy Policy and Conservation Act (EPCA) that are particularly relevant for LMI solar programs:

- The definition of weatherization materials was clarified to include renewable energy technologies.
- The DOE was authorized to consider non-energy benefits (such as safety and health improvements) when creating WAP procedures.
- A grant program (up to \$2M per grant) was established for new and inventive weatherization services and allows private contractors to qualify for technical training grants. Application rules are expected to be in place by April 2021, with the first awards made by October 2021. Co-ops may want to follow progress on this program's development in the coming months as they may be able to apply.

Finally, co-ops may be able to use philanthropic sources, including Operation RoundUp®⁴⁵ funds, private donations, and grants to offset community solar subscription fees or help finance member-owned systems.^{46,47}

⁴² <https://energyoffice.colorado.gov/rooftop-solar-pv>

⁴³ For additional information, see NRECA's October 2020 Business & Technology Advisory, *Research on using low-income home energy assistance (LIHEAP) to achieve solar affordability for co-op communities in need*. <https://www.cooperative.com/programs-services/bts/Documents/Advisories/Advisory-ACCESS-Research-of-LIHEAP-Overview-Oct-2020.pdf>

⁴⁴ For the full text of these updates, see Section 1011 Weatherization Assistance Programs on page 798 of the Division O – Extensions and Technical Corrections (PDF page 3256) and Section 1011 Weatherization Assistance Program on page 2 (PDF page 2) at: <https://rules.house.gov/sites/democrats.rules.house.gov/files/BILLS-116HR133SA-RCP-116-68.pdf> and <https://www.energy.senate.gov/services/files/32B4E9F4-F13A-44F6-A0CA-E10B3392D47A>

⁴⁵ Operation Round Up® has been widely adopted by electric cooperatives across the U.S. to collect funds for community support. The program was created by Palmetto Electric Cooperative in 1989. Program design, communication and marketing materials are available to other electric cooperatives under license agreement. For information, visit: <https://www.palmetto.coop/1214-2/>

⁴⁶ For example, Orcas Power and Light Company (OPALCO) allows members to donate community garden solar shares to members in need: <https://www.opalco.com/community-solar-donation-form/>

⁴⁷ See also NRECA ACCESS Case Study on Roanoke Electric Cooperative: <https://www.cooperative.com/programs-services/bts/access/Documents/Advisory-ACCESS-Case-Study-Roanoke-Oct-2020.pdf>

Hybridization

Bundling solar with other programs and measures, sometimes known as hybridization, can have significant benefits for participants, financing institutions, communities, and cooperatives. Doing so may encourage members to take advantage of co-op offerings they may not have considered. This can benefit co-ops by consolidating marketing efforts, enabling them to pair complimentary services, and increasing member satisfaction through innovation. For example, [Steele Waseca's SUNNA project](#)⁴⁸ offers discounted shares of their community solar program for members who install controllable water heaters.⁴⁹ North Carolina's Blue Ridge Energy's low-income solar pilot program includes weatherization. (See [Case Studies](#) section for more details.)⁵⁰

Hybridized programs can be particularly helpful to LMI members because they can make it easier for members to sign up for a range of new services and savings opportunities. LMI members may already be overwhelmed with forms, applications, and registrations. The time savings from getting multiple services with one sign up or from being automatically qualified based on participation in other assistance programs is very appealing. Measures that are already included in hybridized LMI solar programs, or that are good candidates for it, are discussed in this section.

Weatherization and energy efficiency are the workhorses of residential energy bill reductions and comfort improvements. Utility weatherization and energy efficiency programs often save energy for much less than it costs to generate it and can reduce bills by 30% or more.⁵¹ When weatherization and efficiency upgrades precede solar additions, solar systems can be downsized to fit the smaller load, and LMI solar program funding can benefit more members. Further, solar can complement these measures to significantly reduce electric energy burden.

State and federal programs that help low-income families with energy burdens can play an invaluable role for co-ops wanting to offer LMI programs. Programs like WAP and LIHEAP have the tools and expertise to qualify members for services based on income and participation in other social support services, in addition to potential financing opportunities mentioned above. Income-qualification has many sensitivities and co-ops may not be equipped, nor want, to wade into this area. Because partnerships with outside organizations may involve some risk to the co-op, and effort on the part of all organizations to learn how best to work together, co-ops may want to choose partner organizations that already have longevity and good relationships in the community.

While there are few examples of co-ops offering hybridized LMI solar programs with emerging technologies, some new opportunities include:

- Broadband

⁴⁸ [Steele Waseca's SUNNA project: https://swce.coop/swce-field-services/renewables/](https://swce.coop/swce-field-services/renewables/)

⁴⁹ For more information, see: <https://minnesotaproject.wordpress.com/>

⁵⁰ In addition to the co-ops profiled in this report, several of the co-ops participating in the ACCESS project are also planning hybrid projects. For example, Roanoke Electric Cooperative is partnering with a philanthropic entity to address urgent housing repairs, energy efficiency upgrades and solar access. See Case Study: <https://www.cooperative.com/programs-services/bts/access/Documents/Advisory-ACCESS-Case-Study-Roanoke-Oct-2020.pdf>

⁵¹ <https://www.nmcaa.net/energy.asp>

- Smart thermostats and other deployable load controls
- Electric vehicles
- Electric school buses⁵²
- Other beneficial electrification measures, like heat pumps⁵³
- Energy storage through batteries, water heaters, etc.

All these measures have close synergies with solar programs by enhancing communication, building or reducing the co-op's load as needed, helping members save energy and money, and empowering LMI members to gain experience and comfort with new technologies. To finance these efforts, on-bill loans and tariffs may be a good fit for many measures in hybridized programs.

⁵² <https://www.cooperative.com/remagazine/articles/Pages/co-ops-see-electric-school-bus-builds-interest-electric-vehicles.aspx>

⁵³ <https://www.cooperative.com/topics/beneficial-electrification/Pages/Understanding-Beneficial-Electrification.aspx>

Case Studies

The examples in this section illustrate various ways that co-ops and other utilities are helping LMI members access solar energy through tried-and-true program and financing tools, new approaches, and novel hybridization of services.

➤ Blue Ridge Energy

[Blue Ridge Energy](#) provides electricity, propane, fuel oil, and kerosene to seven counties in the mountains and foothills of northwestern North Carolina. The co-op has a goal of reducing its carbon footprint 50% by 2030 and net zero carbon emissions by 2050. In addition to a utility-scale solar array slated for a 2021 completion, they offer energy efficiency and weatherization rebates, outreach on electric vehicles, a Beat the Peak program, and a [community solar program](#)⁵⁴ which includes a new pilot program for low-income members.



Started in 2020, the North Carolina Weatherization Assistance Program (NCWAP) low-income solar pilot program leverages community partnerships with the goal of saving participants \$365 per year for 15 years through community solar.⁵⁵ Blue Ridge was selected for the 40-home pilot along with Roanoke Electric Cooperative and Fayetteville Public Works Commission.⁵⁶ NCWAP pays for the pilot participants' monthly community solar subscription fees. NCWAP's budget of \$3,200 per home covers a four-panel subscription at Blue Ridge's community solar subscription price (\$3.75 per panel per month)⁵⁷ for 17.7 years – nearly three years longer than the pilot's goal.

The pilot has several innovative features:

- Community partnerships: Area WAPs refer potential pilot participants to the co-op.
- Hybridization of services: Area WAPs perform energy efficiency and weatherization upgrades to participating homes prior to the addition of solar.
- Measurement and verification: Co-op models expected savings to screen participants, then verifies actual savings to assess the pilot's effectiveness and support future programs.

⁵⁴ <https://www.blueridgeenergy.com/powerful-solutions/community-solar>

⁵⁵ Savings from weatherization and other program measures are in addition to those resulting from the community solar program.

⁵⁶ <https://deq.nc.gov/news/press-releases/2019/10/15/north-carolina-weatherization-assistance-program-announces-community>

⁵⁷ <https://www.blueridgeenergy.com/powerful-solutions/community-solar>



Figure 5. Blue Ridge Energy NCWAP Low-Income Solar Pilot Team

Image courtesy of Blue Ridge Energy, <https://www.blueridgeenergy.com/news/article/162>⁵⁸

The co-op has enlisted six of its 10-home pilot quota and expects to fill the remaining spaces soon; however, the coronavirus is delaying WAPs gaining access to homes. According to Jon Jacob, manager of energy solutions, “The thing that I really like about this pilot is that you're helping a low-income member save money on their bill in a real way. But it's not charity. They are basically participating in a community solar program which has very real benefits for the environment, for our local area, for the cooperative, and for the people who work there and provide your power because we're generating this energy locally.”

In addition to the bill savings goal, the program also has energy justice goals. In a press release, Secretary Michael S. Regan of NC Department of Environmental Quality stated, “Programs like this are key to creating a just and equitable transition to a clean energy economy.”⁵⁹

How community solar can benefit low-income members will be determined during the pilot, but Blue Ridge already knows that community solar benefits the co-op. Their five 100 kW community solar gardens save tens of thousands of dollars each year in avoided coincident peak charges, which helps in the effort to keep rates down for all members.

⁵⁸ L to R: Jeremy Greer and Stephanie Ashely of Blue Ridge Community Action; Jon Jacob, Blue Ridge Energy's Manager of Energy Solutions, Michael S. Regan, NC Secretary of Department of Environmental Quality, Jason Lingle, Blue Ridge Energy's Director of Energy Solutions; Susan Greer, Blue Ridge Energy's Energy Solutions Advisor, and Shawna Hanes of Blue Ridge Community Action.

⁵⁹ <https://deq.nc.gov/news/press-releases/2019/10/15/north-carolina-weatherization-assistance-program-announces-community>

Jacob stressed the changing role for community solar. After a recent presentation he gave, colleagues from other co-ops “were really astounded that people were saving money with community solar.” Many considered it a premium program that cost members more. Furthermore, members are now looking to solar to lower their bills. “If cooperatives figure out ways to align their programs with that expectation, I think it’ll lead to higher engagement and higher satisfaction, which is what we’re supposed to be doing.”

It’s safe to say that Blue Ridge values what solar brings to the co-op and all members, including its LMI members. In 2021, the co-op will scale up their solar resources with the addition of an 11 MW solar array, some of which might be used to expand their community solar program.

➤ Mountain Parks Electric Electrify Everything! Program

Colorado’s [Mountain Parks Electric, Inc.](#) began their Electrify Everything! program in July of 2020. According to Rob Taylor, manager of member relations and communications, they already have 60 applications for the new on-bill tariff program through which members can finance heat pumps, commercial EV chargers, insulation upgrades, and the most popular measure so far, solar panels.



The co-op borrowed \$10 million in 0% interest RESP funding. Members who have 12 months of good bill payment history qualify for the program; no additional credit checks are required. Residential PV systems up to 25 kW can be financed at 2% interest over 10 years. The program uses NREL’s PVWatts® Calculator to estimate performance of proposed systems. For additional PV financing assistance, members may retire their capital credits early and apply them to their payments.⁶⁰

➤ Hawaii’s GEM\$ Program

In Hawaii, LMI customers, non-profits, and rental multi-family buildings served by the Hawaiian Electric Companies (HECO) can finance residential rooftop and site-located solar photovoltaic (PV) systems, solar thermal water heaters, solar PV water heaters, and heat pump water heaters, as well as selected commercial solar and energy efficiency measures through the [Green Energy Monday Saver \(GEM\\$\)](#)⁶¹ on-bill tariff program, launched in April of 2019. The program is funded and offered by the Hawaii Green Infrastructure Authority, a green bank.⁶²

The on-bill tariff is tied to a property’s meter, not an individual, making the program feasible for homeowners and renters. The program uses bill payment history, not credit scores, to qualify participants. If a GEM\$ participant moves, the future occupant assumes the on-bill obligation and

⁶⁰ For additional information, see: <https://www.eesi.org/articles/view/mountain-parks-electric-launches-electrify-everything-on-bill-program>

⁶¹ <https://gems.hawaii.gov/participate-now/for-homeowners/>

⁶² <https://gems.hawaii.gov/learn-more/about-us/>

receives the benefit of savings.⁶³ For a project to qualify for the GEM\$ program and to protect participants, projected savings from proposed measures must ensure the future energy bill, including the monthly payment, is at least 10% lower than the old bill. The GEM\$ program further supports LMI homeowners to own the solar panels installed on their rooftops, which may increase the property value.

In just its first nine months, GEM\$ has funded \$6.6 million in PV projects; nearly 80% of that has been for LMI customers. To promote clean energy access to LMI customers, as of September 2019, GEM\$ is available only to households below 140% of area median income (AMI).⁶⁴

While the program is administered by non-co-op electric utilities now, it is possible that GEM\$ could be expanded to Kauai Island Utility Cooperative, the state's only electric cooperative, with additional loan capital and approval from the Hawaii Public Utilities Commission.⁶⁵

➤ **Cherryland Electric Cooperative's Low Income Solar Pilot Program**

In 2018, Michigan's [Cherryland Electric Cooperative](#) began a [Low Income Solar Pilot Program](#) in partnership with the Michigan Agency for Energy (MAE) and the Northwest Michigan Community Action Agency (NMCAA). Through the MAE's participation in the U.S.



Department of Energy's Clean Energy for Low Income Communities Accelerator (CELICA) program, Cherryland received \$80,000 to put towards a \$270,000, 50-home pilot program that combines weatherization, energy efficiency, and community solar for qualifying LMI members. The premise is to reduce bills as much as possible through known, cost-effective approaches – weatherization and energy efficiency – before adding the additional benefit of solar energy credits. Broader program objectives include:

- Moving low-income families towards self-sufficiency by reducing energy costs, and
- Aiding the environment by expanding access to clean, renewable energy.

The pilot, jointly administered by Cherryland and NMCAA, leverages core strengths of both organizations and shows the value of community partnerships for LMI programs. NMCAA identifies and qualifies participants based on income and having previously received assistance from NMCAA. Both homeowners and renters of single-family homes are eligible. NMCAA also performs weatherization and energy efficiency upgrades in participants' homes. Cherryland oversees participant enrollment in their community solar program and ensures virtual net metering credits are applied to participants' bills. Cherryland is also gathering energy use data on participating homes before and after enrollment so that they can measure savings.

Each participant receives an initial visit from a Cherryland energy advisor to review potential weatherization and energy efficiency upgrades and discuss energy usage habits. Then, each participant is

⁶³ The program requires landlords to disclose a property's GEM\$ participation.

⁶⁴ <https://www.eesi.org/obf/case-study/hawaii>

⁶⁵ <https://www.eesi.org/obf/case-study/hawaii>

allotted nine shares each of Cherryland’s existing community solar program at no cost. Annual credits from the solar shares were expected to be about \$350 per year per household, and so far, the program is meeting that expectation. From 2018 to 2020, actual annual credits from solar shares ranged from \$330 to \$375 per participant, averaging around \$30 per month, depending on the year’s weather. The goal is to lower participants’ bills by the expected range of 15% to 40% from weatherization and energy efficiency upgrades⁶⁶ and then achieve additional savings through community solar shares for an overall bill reduction of up to 70%.

The co-op continues to gather data so that they can release complete pilot results in the future. If possible, Cherryland plans to document savings from individual measures separately: weatherization, energy efficiency upgrades, behavior modifications, and solar credits. To date, program staff have not observed changes to participants’ energy usage behaviors, but the analysis is ongoing. In addition, the co-op will track changes to participants’ dependence on energy assistance programs and disconnects for nonpayment.⁶⁷

➤ Colorado Low Income Solar Pilot

Seven Colorado cooperatives are showing how partnerships with state agencies and non-profits can have a big impact.⁶⁸ In 2010, Colorado became the first state to encourage participation in community solar programs with a 5% carve-out for low-income residents as part of its [Community Solar Garden Act](#) which was further expanded in 2015.⁶⁹ Building upon that goal, the Colorado Energy Office (CEO) leveraged its Weatherization Assistance Program (WAP) to bundle energy efficiency with solar in a low-income demonstration project.

Starting in 2015, the CEO awarded a \$1.2 million grant to [GRID Alternatives](#)⁷⁰, a non-profit solar installer that focuses on providing solar to low-income families and solar workforce development. GRID Alternatives then partnered with seven electric cooperatives — Delta-Montrose Electric Association, Empire Electric Association, Grand Valley Power, Holy Cross Energy, Poudre Valley Rural Electric Association, Yampa Valley Electric Authority, and San Miguel Power Association — and Fort Collins Electric Utility, a municipal utility. All participating utilities agreed to provide 2:1 match funding and to work towards *no up-front* cost subscriptions for low-income members.

The goals of the pilot were to:

- Support low-income community solar demonstration projects
- Incorporate PV into CEO’s weatherization program

⁶⁶ <https://www.nmcaa.net/energy.asp>

⁶⁷ For more information, see <https://www.cherrylandelectric.coop/2018/02/cherryland-pilots-low-income-solar-program/> and NRECA Case Study on Cherryland Electric Cooperative: <https://www.cooperative.com/programs-services/bts/energy-access/Documents/Advisory-Advancing-Energy-Access-for-All-Case-Study-Cherryland-June-2019.pdf>

⁶⁸ See also: <https://www.electric.coop/sunda-bringing-power-community-solar-entire-community/>

⁶⁹ <https://www.lowincomesolar.org/best-practices/community-solar-colorado/>

⁷⁰ [GRID Alternatives is also a project partner on the ACCESS project.](#)

- Promote utility investment in low-income PV programs⁷¹

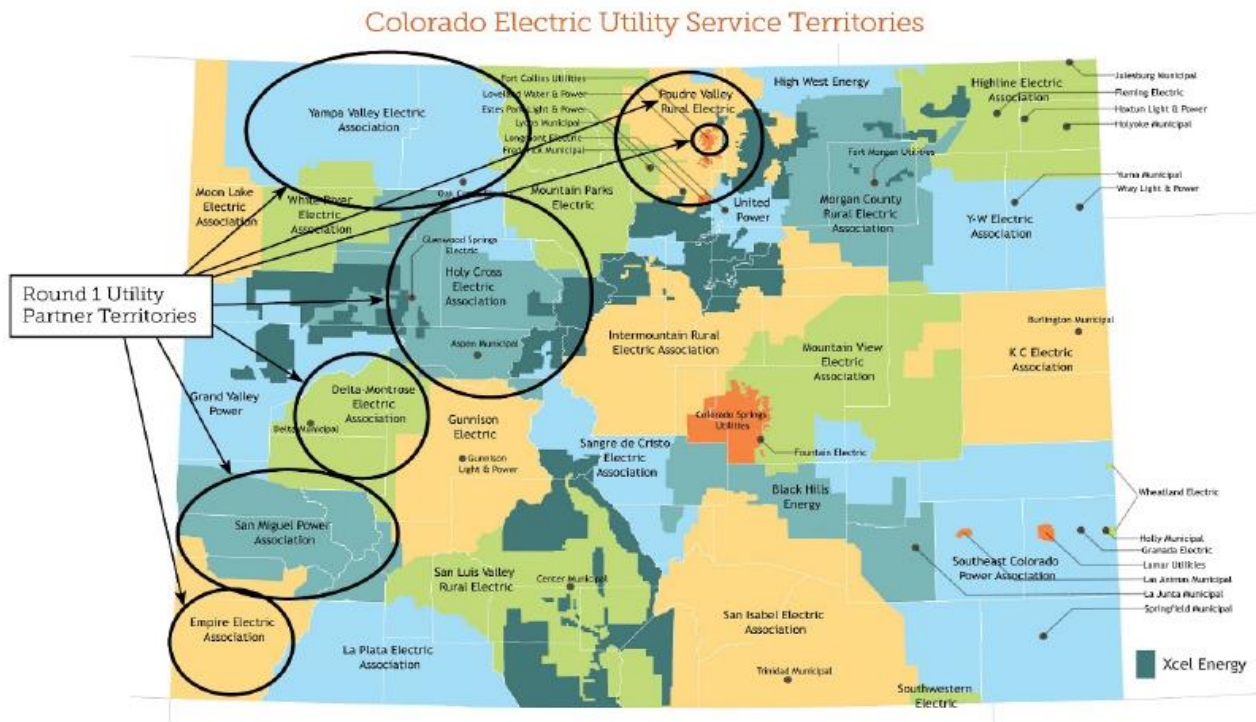


Figure 6. Colorado Electricity Utility Service Territories - Low Income Solar Pilot.
Source Dobos et al. 2017

While program structure and savings goals varied among participating utilities, overall pilot structure was similar. GRID Alternatives led project design, development, installation, and in a few cases, was contracted by the utility to manage operations and maintenance. Because GRID Alternatives uses a community participation model, community development activities like workforce training and volunteer opportunities were an integral part of the program. Co-ops provided the required match funding or financing, land, interconnection, and subscription management. To target appropriate participants and maximize the benefit of solar, the pilots reached out to households that had recently received weatherization assistance from state organizations.

By October 2017, these eight community solar projects provided 1.5 MW of solar to 380 LMI households. Poudre Valley Rural Electric Association (PVREA) developed the largest of these projects at 1.95 MW, with 700 kW devoted to LMI households and an additional 500 kW dedicated to 16 local nonprofits. (The remainder of PVREA’s development was available to other members.) Across all eight LMI programs, participants save between 15% and 50%, or \$130 to \$590 per year, on their electricity bills from bill credits based on their community solar subscriptions (Dobos et al. 2017). “The variation in savings is largely a function of subscription size and the structure of electricity rates at each cooperative (e.g., level of fixed charges versus volumetric charges)” (Cook and Shah 2018, p. 6).

⁷¹ Cook and Shah 2018

In addition to the bill reductions, a 2017 project summary report by the CEO concluded, “Each of the eight utility partners experienced significant qualitative benefits including (but not limited to): marketing opportunities; meeting renewable energy goals and regulations; reducing costs for low-income households; reducing the risk of non-payments, and increasing their knowledge of solar procurement and ownership” (Dobos et al. 2017 p. 2).

Recommendations & Conclusion

These and other examples show how co-ops are working to ensure their LMI members are not left behind when it comes to solar. For co-ops interested in pursuing similar programs, some considerations are as follows:

- Look for opportunities to leverage existing on-bill loan and tariff programs.
- Investigate funding and partnership opportunities from state energy offices, LIHEAP, WAP, and other low-income energy assistance programs who regularly do income qualification.
- Combine solar offerings with other programs that benefit LMI members, such as weatherization, energy efficiency, load control, broadband, and even newer technologies like electric vehicles and energy storage.
- Work with non-profits and community-based partners that provide LMI programs and services.
- Set aside a portion of each community solar garden for LMI members, and support participation by reducing or removing upfront costs.
- Consider if a new rate would help support co-op and LMI member needs.
- Determine if there are opportunities to collaborate with other co-ops in the same region to share or expand on existing program designs.
- Engage stakeholders early and often, keeping in mind that LMI members may be financially risk-averse and place a high value on working with trusted organizations.
- Develop applicable member education programs

Electric cooperatives can continue to lead the industry and fulfill their missions of service to members by helping all members access solar energy in ways that support individual members while benefiting the entire community. Done well, these investments may even provide a significant return on investment as solutions provide benefits for voltage regulation, peak reduction, and bill payment.

The next report in this series will provide insights from several generation and transmission (G&T) electric cooperatives on the future of solar at electric cooperatives, including solar plus storage projects.

References

Clean Energy States Alliance (CESA). (December 2018). *A directory of state clean energy programs and policies for low- and moderate-income residents.*

Cook, Jeffrey J. and Monisha Shah. (2018). *Reducing energy burden with solar: Colorado's strategy and roadmap for states.* Golden, CO: National Renewable Energy Laboratory. NREL/ TP-6A20-70965.

Deloitte. (2016). *Unlocking the value of community solar: Utilities find opportunity in the inevitable growth of distributed energy resources.*

Dobos, Hillary, E. Artale, D. Gagne, A. Aznar, J. Pereira, G. Weaver, and L. Stegall. (2017). *Insights from the Colorado Energy Office Low-Income Community Solar Demonstration Project.*

Environmental and Energy Study Institute (n.d.). *Rural Energy Savings Program.*

Gagne, D. and A. Aznar. (April 2018). *Low-income community solar: Utility return considerations for electric cooperatives.* National Renewable Energy Laboratory. NREL/TP-7A40-70536

Hummel, H., and Toth, M. S. (2019). Utility investment vs. consumer loans: Getting to yes on energy efficiency through inclusive financing for all. *UC Berkeley: Behavior, Energy and Climate Change Conference.*

National Rural Electric Cooperative Association (NRECA). (July 2016). *Rate case studies.*

Paulos, B. (2017). *Bringing the benefits of solar energy to low-income consumers.* Clean Energy States Alliance (CESA) and the U.S. Department of Energy SunShot Initiative.

Sigrin, Ben and M. Mooney. (2018). *Rooftop solar technical potential for low-to-moderate income households in the United States.* Golden, CO: National Renewable Energy Laboratory. NREL/TP-6A20-70901.